

WE CLAIM:

1. In a communication device, a method of synchronizing at least one known coefficient to a transmitted signal having an arbitrary power value, said method comprising:

determining a quantization bit indicative of said arbitrary power value;

correlating said quantization bit with said at least one known coefficient to obtain a correlated signal;

selecting said correlated signal when said correlated signal matches a given criterion;

synchronizing said transmitted signal with said at least one known coefficient using said selected correlated signal.
2. The method as claimed in claim 1, wherein said determining a quantization bit comprises applying a signum function to said arbitrary power value, said signum function being defined as $\text{sgn}(f)=1$ when $f \geq 0$ and $\text{sgn}(f)=-1$ when $f < 0$.
3. The method as claimed in claim 2, further comprising mapping said quantization bit to provide a mapped quantization bit equal to one of 0 and 1, further wherein each of said at least one known coefficient is equal either to one of 0 and 1, and further wherein said correlating comprises correlating said mapped

quantization bit with said at least one known coefficient to obtain said correlated signal.

4. The method as claimed in claim 3, wherein said correlating comprises using a XOR function.
5. The method as claimed in claim 1, wherein said at least one known coefficient comprises a sequence of known coefficients, further wherein said correlating is performed using at least said sequence of known coefficients to provide a plurality of correlated signals, further wherein said selecting comprises generating a value indicative of a synchronization between said sequence of known coefficients and said transmitted signal and selecting said correlated signals from said plurality of correlated signals when said synchronization indicative value matches said given criterion.
6. The method as claimed in claim 1, further comprising the step of providing said given criterion.
7. The method as claimed in claim 1, wherein said criterion is selected from a group consisting of the maximum value of said correlated signal, a statistical function depending on said correlated signal and a threshold value for said correlated signal.
8. The method as claimed in claim 5, wherein said criterion is selected from group consisting of the maximum value of said synchronization indicative value,

a statistical function depending on said synchronization indicative value and a threshold value for said synchronization indicative value.

9. In a communication device, a synchronizer for synchronizing a known sequence of coefficients, said sequence of coefficients having a real part and an imaginary part, to an incoming input signal, said incoming input signal having a real part and an imaginary part, comprising:

a first correlation unit correlating said imaginary part of said incoming input signal with said imaginary part of said sequence of at least one coefficient to provide a first correlated signal;

a second correlation unit correlating said real part of said incoming input signal with said real part of said sequence of at least one coefficient to provide a second correlated signal;

a third correlation unit correlating said imaginary part of said incoming input signal with said real part of said sequence of at least one coefficient to provide a third correlated signal;

a fourth correlation unit correlating said real part of said incoming input signal with said imaginary part of said sequence of at least one coefficient to provide a fourth correlated signal;

a first adding unit subtracting said first correlated signal and said second correlated signal to "4" to provide a first added signal;

a second adding unit subtracting said third correlated signal and adding said fourth correlated signal to provide a second added signal; and

a criterion matching unit determining which of said first added signal and said second added signal matches a given criterion.

10. In a communication system, a synchronizer for determining when a transmitted signal, having an arbitrary power value, matches at least one known coefficient, said synchronizer comprising:

a quantizer determining a quantization bit indicative of said arbitrary power value;

a correlator to correlate said quantization bit with said at least one known coefficient to obtain a correlated signal;

a selector to select said correlated signal when said correlated signal matches a given criterion.

11. The synchronizer as claimed in claim 10, wherein said quantizer comprises a calculator applying a signum function to said arbitrary power value, said signum

function being defined as $\text{sgn}(f)=1$ when $f \geq 0$ and $\text{sgn}(f)=-1$ when $f < 0$.

12. The synchronizer as claimed in claim 11, wherein said quantizer further comprises a mapping unit to provide a mapped quantization bit equal to one of 0 and 1 after applying said signum function, further wherein said at least one known coefficient is equal either to one of 0 and 1 and further wherein said correlator correlates said mapped quantization bit with said at least one known coefficient to obtain said correlated signal.
13. The synchronizer as claimed in claim 10, wherein said at least one known coefficient comprises a sequence of known coefficients, further wherein said correlator correlates said sequence of known coefficients to provide a plurality of correlated signals, further wherein said selector generates a value indicative of a synchronization between said sequence of known coefficients and said transmitted signal and further selects the correlated signals from said plurality of correlated signals when said synchronization indicative value matches said given criterion.
14. The synchronizer as claimed in claim 10, wherein at least one of said quantizer, said correlator and said selector is implemented in one of a Field Programmable Gate Array (FPGA) and an Application Specific Integrated Circuit (ASIC).